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TECHNICAL MEMORANDUM

CH2MHILL

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Subject: Draft Final Screening and Baseline Ecological Risk Assessment for Sites 2B, 11, 16, 16GC, 21, 22 and 26. NAS Oceana, Virginia Beach, Virginia. April 2001

The purpose of this memorandum is to respond to comments received from BTAG on April 25, 2001 regarding the "red-line" Final Ecological Risk Assessment for SWMUs 1 and 15 and, as agreed to in the May 2, 2001 Partnering Meeting, to discuss how each comment will be addressed in the Ecological Risk Assessment for SWMUs 2B, 11, 16, 16GC, 21, 22, and 26 at NAS Oceana.

1. The Executive Summary states that potential risks to lower trophic level terrestrial organisms (e.g., soil invertebrates) are relatively high based on the magnitude of the surface soil exceedences for polycyclic aromatic hydrocarbons (PAHs). However, the planned soil tilling activities are expected to reduce these PAH soil concentrations substantially based on the experience from the remediation of the biopiles. A reduction in risk to acceptable levels will need to be documented through development of a PAH concentration protective of ecological receptors and long-term monitoring of the soil following tilling to demonstrate that the level has been achieved.

This comment is specific to the SMWU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Based on the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to include only data/information used to determine and characterize the risk to ecological receptors posed by these sites. In addition, the ERA was revised to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. Therefore, all references to potential future actions (e. g. additional soil tilling at SWMU 15) were deleted from the ERA and will be discussed in the FS.

2. The Executive Summary states that if target total petroleum hydrocarbon levels are met for SWMU 15, no further action is recommended for these soils. The document further states that based on these recommendations, the ERA process should stop at Step 3A. Soil tilling is an action meant to address ecological risk at the site. It is unclear why this action is included as part of the ERA process. Given the risk in soils at SWMU 15, the process should continue to Step 7 (Risk Characterization). Soil tilling would be the mechanism to deal with the risk at the site. It is unclear why the ERA process is not continuing. This comment also applies to the statement in Section 7.0

This comment is specific to the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Based on the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to include only data/information used to determine and characterize the risk to ecological receptors posed by these sites. In addition, the ERA was revised to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. Therefore, all references to potential future actions (e. g. additional,soil tilling at SWMU 15) were deleted from the ERA and will be discussed in the FS.

3. In the Executive Summary (4th paragraph), the statement, "Potential risks to aquatic organisms utilizing SWMU 15 are expected to be low based on the magnitude of the sediment and food web," is confusing and needs to be clarified.

This editorial comment was addressed in the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA.

4. In Section 3.3 (Exposure Estimate), the first paragraph contains the statement that this set of preliminary COPCs includes chemicals with hazard quotients (HQs) in excess of 1 (based on maximum exposures) and chemicals for which assessment data were not available. This statement needs to change to, "...with hazard quotients (HQs) equal to or in excess of 1...."

This is an editorial comment; the text will be corrected in the Final SWMU 1 and 15 ERA and subsequent ERAs.

5. In Section 3.3, the statement is made that mean concentrations may be appropriate for evaluating potential risk to populations of lower trophic level terrestrial and aquatic receptors because the members of the population are expected to be found throughout the site where habitat is present rather than concentrated in one particular area. Because lower trophic level terrestrial and aquatic receptors have limited mobility, the mean concentration is likely not appropriate for evaluating risks. The more reasonable approach is to utilize the maximum contaminant concentrations for comparison to screening values.

Maximum contaminant concentrations are used for comparison in Step 2 of the Ecological Risk Process. In Step 3, the mean contaminant concentrations are used to show a more realistic 'snapshot', and less conservative, of how possible contamination at the site impacts populations of lower trophic level receptors. Comment noted; however, no changes in text are deemed necessary at this time. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise "boiler plate" sections of LANTDIV ERAs.

6. In Section 3.3, the last statement made is that chemicals that were not detected but were retained as COPCs in the SERA because the maximum reporting limit exceeded the respective screening value or no screening value was available, were not further evaluated in Step 3A. The logic for not evaluating these chemicals needs to be documented here.

A discussion of the logic for not evaluating these chemicals will be added to section 3.3 of the SWMU 2B et al. ERA. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise "boiler plate" sections of LANTDIV ERAs.

7. In Section 3.3.3.2 (Dietary Intakes), the statement is made that in the dietary intake formula average values presented in EPA 1993 were used when appropriate. The "appropriate" conditions under which average values were used need to be documented in this section.

An explanation of the “appropriate conditions” will be added to the SWMU 2B et al. ERA. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise “boiler plate” sections of LANTDIV ERAs.

8. In Section 4.2, there is a reference to the Virginia Pollution Discharge Elimination System monitoring program. This reference implies that contaminants of importance at these sites are monitored through this program. However, documentation of this implication is not provided. This documentation needs to be added.

This comment is specific to the SMWU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. If a discussion of the VPDES monitoring is added to the SWMU 2B et al ERA, it will be explained that the purpose of the program is to monitor the ditch because it is a spill control device, not to monitor for contaminants.

9. Section 4.5.1 (Aquatic Habitats) contains the new paragraph explaining how the significance between upgradient and downgradient data will be determined. This explanation, which includes the use of both 25% and 50% values is still not clear, and upon further consideration does not appear reasonable. The significance between on-site chemical concentrations and upgradient chemical concentrations needs to be determined by a simple comparison of both maximum and mean chemical values for each location. This comparison will yield a HQ type ratio which can then be interpreted as if the HQ is greater than 1.0, the site has released that chemical because the downgradient concentration exceeds the upgradient concentration. If the data sets are sufficiently robust, then calculating a 95% confidence interval around the mean and maximum values may assist in showing differences between these data sets.

Comment noted. Due to the amount of variability in standard analytical methods that is considered acceptable (that is, meets data quality objectives), a straight ratio comparison (these are not true hazard quotients) of on-site and background was not felt to be appropriate. The approach described in the ERA provides an objective, technically based method to determine whether it can not or cannot be discerned that two reported concentrations are different. This approach has value when sample sets are not robust and statistical distributions cannot be used as suggested. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise “boiler plate” sections of LANTDIV ERAs.

10. In Section 4.5.2 (Terrestrial Habitats), the statement is made that the potential for risks in terrestrial habitats are negligible for all PAHs, with the possible exception for indeno[1,2,3-cd]pyrene which had a HQ or 1.07. Between this section and Section 4.5.3 (Conclusions), the importance of this contaminated 1.03 acre (300 feet by 150 feet) area is not clear.

This comment is specific to and was addressed in the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Section 4.5.2 is presenting results, and Section 4.5.3 lists recommended conclusions based on those results as well as the spatial delineation of the contamination. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements “no further action is recommended” and “the ERA process would stop at Step 3A” that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA’s Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections.

11. In Section 4.5.3 (Conclusions), the next to the last paragraph does not appear to accurately reflect the lines of evidence for surface soils at SWMU 1. The first line of evidence indicates that five metals had detected concentrations exceeding screening values, but these concentrations were below background soil levels. The possibility that the background data set does not accurately reflect true background concentrations needs to be discussed. The second line of evidence indicates that seven detected PAHs had concentrations exceeding screening values with HQs less than 2.0 (assumed between 1.0 and 2.0). Although the document does not make the connection, the assumption can be made that these data define the area (300 feet by 150 feet) of potential risk to invertebrates. The third line of evidence indicates that only two individual PAH concentrations exceeded background soil concentrations. Considering the high probability that the PAHs on this facility are anthropogenic in origin again brings into question the reliability of the background data set. The last line of evidence indicates that "[exceedences for SVOCs occurred in 1-SS2 (ten exceedences), 1-SS3 (ten exceedences), 1-SS4 (eight exceedences), 1-SS5 (one exceedence), 1-SS7 (four exceedences), and OW01-SS09 (11 exceedences). Exceedences for metals occurred in 1-SS1 (five exceedences), 1-SS2 (six exceedences), and OW01-SS09 (five exceedences)." This text is not clear as to whether or not these exceedences are of background concentrations and/or screening values or these SVOC exceedences include the previously referenced PAHs. The assumption can also be made that these SVOC and metal contaminants were found in this same 300 feet by 150 feet area. Also, if there were up to 11 SVOC exceedences, but only seven PAHs are identified; the rest of the SVOCs (four) with exceedences need to be included in the lines of evidence. With all this information suggesting potential risk in surface soils and questioning the background data set, the conclusion that "[t]he few COPCs that exceeded screening values in surface soil were generally consistent with background soil concentrations and localized" is not substantiated. In fact, these lines of evidence support the need to continue the ERA process to produce a complete baseline ecological risk assessment.

This comment is specific to and was addressed in the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements "no further action is recommended" and "the ERA process would stop at Step 3A" that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA's Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections.

12. In Section 5.3 (Summary of Available Analytical Data), the statement is made that the 50 ppm TPH value is a VADEQ solid waste threshold; and that ecological risk was determined based on a comparison to screening levels and a documented decline in PAH concentrations. Most of the EPA Region 3 BTAG screening values for PAHs are 100 ppb for soil fauna and there is no total PAH screening value. This document is not clear as to how the relatively high potential risk to lower trophic level terrestrial organisms from PAHs will dissolve through soil tilling without monitoring to show success. This implies that success criteria will be identified. The way in which success of the soil tilling will be demonstrated needs to be identified.

This comment is specific to and was addressed in the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Based on the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to include only data/information used to determine and characterize the risk to ecological receptors posed by these sites. In addition, the ERA was revised to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. All references to

potential future actions (e. g. additional soil tilling at SWMU 15) were deleted from the ERA and will be discussed in the FS; however, this section provides a brief summary of the soils that were excavated, treated, and investigated (human health and ecological risks evaluated) as this information is relevant to the site's history.

13. In Section 5.5.4 (Conclusions), the statement is made regarding sediment at SWMU 15 that "[b]ased on the above lines of evidence, COPC concentrations in sediments potentially pose a site-related ecological risk to invertebrates in the sediments of the pond." The pond is approximately 1.6 acres (see Figure 5-1). Six detected chemicals had HQs less than 8 (assumed between 1.0 and 8.0). This evidence does not lead to a conclusion of low risk and no further action (see section 7.0); but rather leads to risk assessors and risk managers proceeding with the next steps of the ERA which would involve agreeing on assessment endpoints and specific questions or testable hypotheses that, together with the rest of the conceptual model, form the basis for the site investigation. Measurement endpoints would be selected, and a plan for filling information gaps developed and written into the ecological work plan and sampling and analysis plan described in Step 4 of the ERA process.

This comment is specific to the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements "no further action is recommended" and "the ERA process would stop at Step 3A" that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA's Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections.

14. Section 5.5.4 on page 5-8 states that hazard quotients for several receptors were greater than one using lowest observed adverse effect levels. However, the conclusion is that there is little potential for site related risk to upper level receptors. The document needs to provide additional justification to support this conclusion (i.e., area use factors, bioavailability).

This comment is specific to the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements "no further action is recommended" and "the ERA process would stop at Step 3A" that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA's Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections.

15. Section 5.5.4 on page 5-8 states that potential risk to aquatic organisms utilizing SWMU 15 are expected to be low based on the magnitude of the sediment and food-web exceedences. It is unclear what is meant by "sediment and food-web exceedences." If these exceedences refer to the magnitude of the hazard quotient, this statement is inappropriate. The document needs to provide additional justification to support the low risk conclusion. Other lines of evidence that may be useful in this documentation may include bioavailability, fate of contaminants, and ecological toxicity information.

This comment is specific to the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements "no further action is recommended" and "the ERA process would stop at Step 3A" that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA's Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections.

16. In Section 5.5.4, regarding surface soils at SWMU 15, the conclusion is that "...there is an isolated, site-related potential risk to invertebrates in an area approximately 400 feet by 400 feet." First, the term "isolated" appears inaccurate when referring to over 3 acres of soil invertebrate habitat and should be deleted. Second, whether or not soil tilling will achieve ecologically relevant criteria is not clearly stated in this document. Therefore, this document needs to specifically describe the process by which ecological success of soil tilling will be demonstrated.

This comment is specific to the SWMU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. Per the agreements made during the May 2, 2001 NASO Partnering Meeting, the SWMU 1 and 15 ERA was revised to clarify the statements "no further action is recommended" and "the ERA process would stop at Step 3A" that are contained in the Draft-Final ERA. These clarifications include text revisions in the Executive Summary and Sections 4.5.3 and 5.5.4 (the conclusion sections for SWMUs 1 and 15, respectively) to reflect that the ecological risks identified in the SWMU 1 and 15 ERA will be addressed in the development of the remedial alternatives in the FS being drafted for these sites. In addition, text revisions to the ERA's Conclusions (Section 7.0) and a new section, Risk Management (Section 8.0) are included in the Final ERA for SWMUs 1 and 15. This comment is addressed in these revised sections. In addition, all references to potential future actions (e. g. additional soil tilling at SWMU 15) were deleted from the ERA and will be discussed in the FS.

17. Section 6 describes a number of uncertainties. Regarding detection limits, the uncertainty stems from the situation when the detection limit exceeds the applicable screening value. In an effort to explain this uncertainty, the author has included the statement, "...the ratio of screening values to detection limits was almost always less than 10 in sediment and surface soil, and usually less than 5 in surface water and groundwater (except for PCBs and pesticides where it ranged from less than one to about 250)." The reason for including this statement is not clear and appears to confound the issue. A better summary would be to identify the number of chemicals by class (VOC, SVOC, pesticide/PCB, inorganic, etc.) where the detection limit exceeded the screening value for the different media.

In the SWMU 2B et al ERA, a discussion and/or table will be added to Section 6 under detection limits heading that lists the number of chemicals by class where detection limits exceed screening values for the different media and the uncertainty associated with risk conclusions based on non-detected chemicals. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and revising "boiler plate" sections of LANTDIV ERAs.

18. In Section 6, the total versus dissolved metals discussion needs to include a statement about the use of total metal concentrations as more accurately reflecting the risk to certain ecological receptors, particularly filter feeders.

A discussion of the use of total metals versus dissolved metals as pertaining to the risk to ecological receptors will be added to Section 6 under the Total Versus Dissolved Metals. This comment will be

further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise "boiler plate" sections of LANTDIV ERAs. revising "boiler plate" sections of LANTDIV ERAs.

19. In Section 6, the sediment screening values discussion indicates that these values do not consider site specific bioavailability and therefore are very conservative and likely overestimate potential risk. While this inference is generally regarded as true, there are times when site specific TRVs have been calculated that were more conservative than the literature derived sediment screening values. This situation also needs to be documented in this paragraph.

This comment will be addressed in the SWMU 2B et al. ERA by adding a discussion regarding conservatism in calculated site-specific TRVs and literature derived TRVs. This comment will be further discussed during the proposed ecological subgroup meeting to resolve comments on the SWMU 2B et al. ERA and/or additional subgroup meetings to revise "boiler plate" sections of LANTDIV ERAs.

20. In Section 6, the new paragraph about the Tri-Service document needs to include the fact that this document was developed "to provide guidance for conducting ERAs for use by risk assessors at Navy, Air Force, and Army installations." In addition, this new paragraph is incomplete because the final sentence does not identify the correct table nor the number of chemicals involved.

This is an editorial comment; the text will be corrected in the Final SWMU 1 and 15 ERA and subsequent ERAs.

21. Section 7.0 on page 7-1 states that considering the relatively low habitat value of these ditches (which are periodically maintained as part of the stormwater system) and the likelihood that upper trophic level receptors would forage elsewhere (where habitat quality was better) much of the time, risks to these species are likely to be negligible. The BTAG commented previously that this statement is unsupported by information presented in the report and it remains unsupported. Given the limited aquatic habitat present on the base, these ditches may provide significant habitat for certain species. Either additional support for this statement should be presented, or the statement should be deleted.

This comment is specific to the SMWU 1 and 15 ERA and is not applicable to the SWMU 2B et al. ERA. If a discussion of the VPDES monitoring is added to the SWMU 2B et al ERA, it will be explained that the purpose of the program is to monitor the ditch because it is a spill control device, not to monitor for contaminants.